UNIVERSITY OF JOHANNESBURG

FACULTY OF EDUCATION

NOVEMBER EXAMINATION 2014

PROGRAMME: B Ed (Senior Phase and FET)

MODULE: CIVIL TECHNOLOGY EDUCATION 2B

CODE: CTE20B2

TIME: 2 hours

MARKS: 110

EXAMINER: Mr W Engelbrecht

MODERATOR: Dr CF van As

(This paper consists of 4 pages)

INSTRUCTIONS

Read the following instructions carefully before answering the questions:

1. Answer **all** the questions.
2. You may answer the questions in Afrikaans or English.

QUESTION 1

Figure 1 shows the building plans for a small dwelling. The plans indicate the following sizes that should be used for calculating quantities of material for the building:

- Foundation is 0,66m x 0,25m
- Concrete floor is 0,075m thick
- Sub-structure is 0,33m thick x 0,45m high
- Super-structure is 0,220m thick x 2,6m high
- Beam filling is 0,11m thick x 0,225m high
- Window opening is 2,1m x 1,2m
- Door opening is 2,1m x 0,9m
- Add 5% waste for bricks.

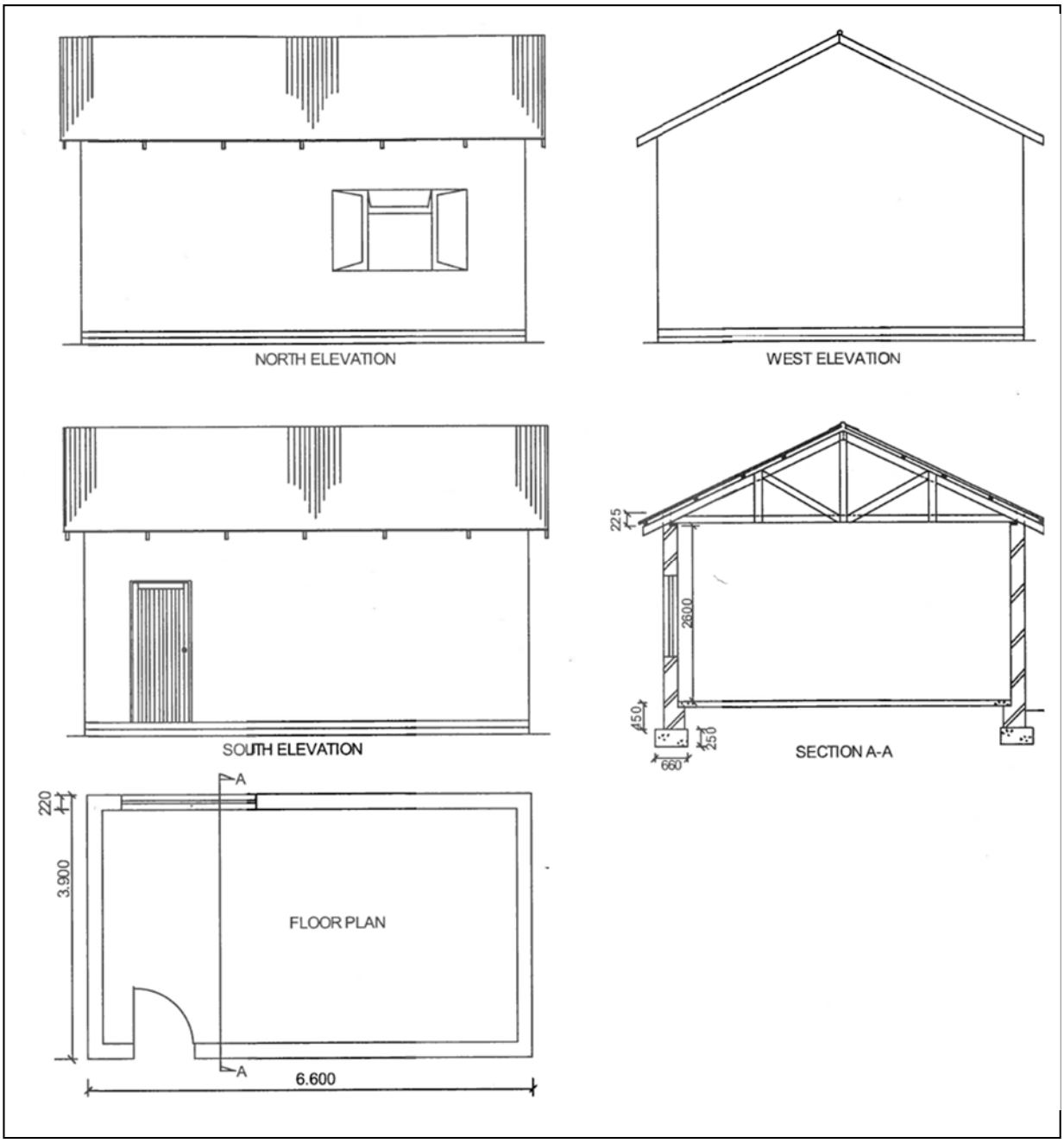


Figure 1: Plans for a small dwelling

Use the above-mentioned data to calculate the quantities of material and compile a quantity list that includes the following:

1.1	Bricks required for the sub-structure	(9)
1.2	Bricks required for the super structure	(9)
1.3	Bricks required for the beam filling	(9)
1.4	Deduction for the substructure recess (where the floor slab overlap on the wall)	(6)
1.5	Deduction for the door opening	(5)
1.6	Deduction for the window opening	(5)
1.7	Total bricks required	(5)
1.8	Concrete for the foundation	(3)

1.9 Concrete for the floor slab (5)
1.10 Damp proof sheeting required (4)
(60)

QUESTION 2

Graphically determine the magnitude of the two unknown forces **L** and **M**, of the system of forces in Figure 2.

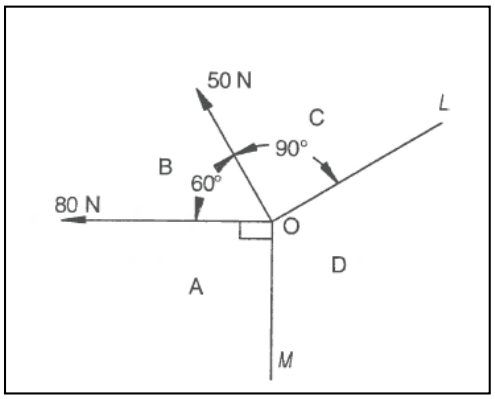


Figure 2: System of forces

(4)

QUESTION 3

3.1 Figure 3 shows a beam with two point loads and one distributed load. Determine the reaction at point **P** and point **Q.**

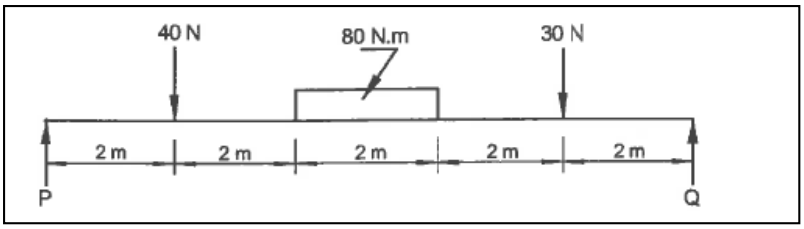


Figure 3: Beam with two point loads and one distributed load

(6)

3.2 Figure 4 shows a beam with three point loads. The beam is supported by P and Q.

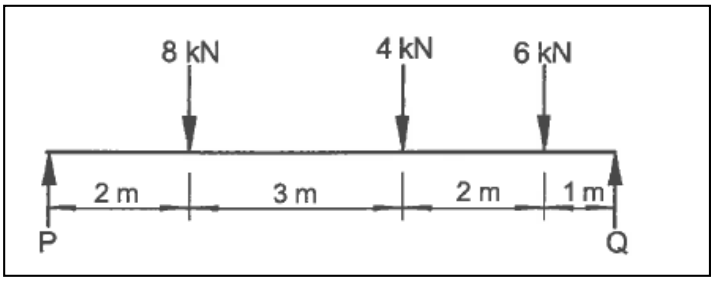


Figure 4: Beam with three point loads

3.2.1 Determine the reactions at point P and Q. (4)
3.2.2 Determine the bending moments. (6)

3.2.3 Draw the bending moment diagram. (2)
3.2.4 Determine the shear force. (6)
3.2.5 Draw the shear force diagram. (2)
(26)

QUESTION 4

Figure 5 shows a frame structure. Develop and draw a vector diagram to determine graphically the magnitude and nature of the force in each member of the frame structure.

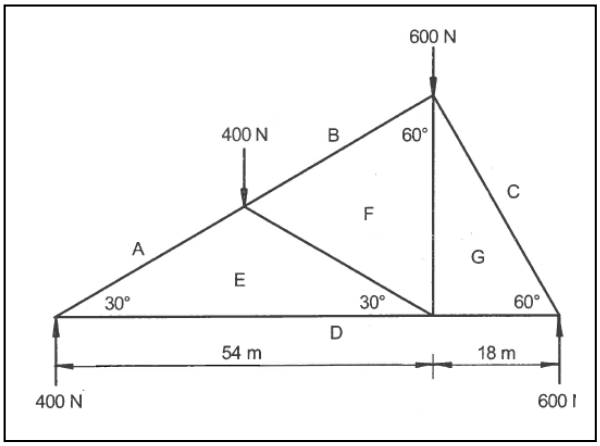
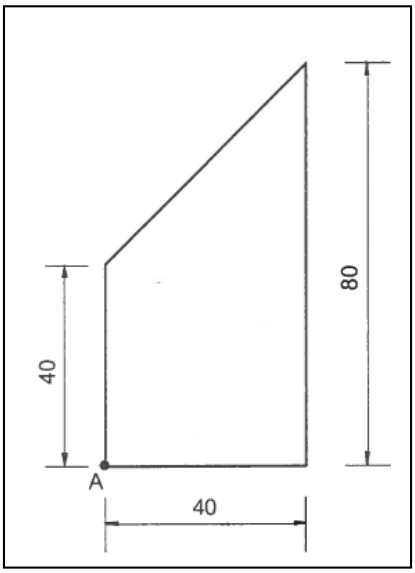


Figure 5: Frame structure

(14)

QUESTION 5

Calculate the centroid of the combined shape in Figure 6, relative to A. Draw the lamina and indicate the centre of gravity on it.



(6)

Figure 6: Combined shape lamina

TOTAL: 110

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